

Systems Reference Library

IBM 1130 Installation Manual—Physical Planning

Ninth Edition (December 1971)

This is a major revision of, and obsoletes, GA26-5914-7 and Technical Newsletter GN34-0057. Material relating to the IBM 1131 Models 1C, 1D, 5B, 5C, and 5D, and the IBM 2311 Disk Storage Drive Models 11 and 12 has been added. Technical changes to the text and illustrations are indicated by a vertical line to the left of the change.

Changes are periodically made to the information herein; before using this publication in connection with the installation or operation of IBM systems, refer to the latest 1130 system SRL Newsletter, GN20-1130, for the editions that are applicable and current.

Some illustrations in this manual have a code number in the lower corner. This is a publishing control number and is not related to the subject matter.

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Preface

This manual contains information necessary for planning the physical installation of the IBM 1130 Computing System. Information required by architects, contractors, (building, electrical, and air conditioning), operating management of machine systems, and communications technical representatives is included.

The major subjects covered are:

- Installation requirements and scheduling
- 1130 system unit specifications

Note. The IBM 1131 Models 4A and 4B, and the IBM 1132 Model 2, are available in the United States and Canada only.

An efficiently operated computer system depends largely on careful planning and preparation prior to actual installation of equipment. The purpose of this manual is to assist IBM customers in the period preceding delivery of new equipment.

The foremost requirement is to provide suitable space and environmental conditions for the components ordered. Consideration should be given not only to the requirements of the system and associated personnel, but also to other equipment, such as storage cabinets, work tables, chairs, and desks.

IBM Installation Planning Representatives are available for assistance and consultation.

The following IBM publications are available to facilitate planning and installation:

1130 System Template (GX26-5997).

1130 System Cable Order Form (Form 120-1696).

SYSTEM ARRANGEMENT AND SPACE REQUIREMENTS

The physical location of the 1130 system components can be arranged to fit the individual needs of the user. Raised floors are not required but offer the following advantages:

1. Provide increased flexibility in system layout by allowing cables to be run direct.
2. Can be used as an air plenum.
3. Provide protection for inter-unit cabling and customer branch circuit wiring.

A compact arrangement of components allows efficient and convenient operation by the system operator.

Consideration should be given to the possible future expansion of the system or installation. Additional machines or equipment can then be added to the initial installation without disruptive revisions to the original plans.

In summary, the following items should be considered in determining space requirements and location:

- Cable routing
- Cable length
- Service clearance
- Work space
- Heat dissipation
- Desk space
- Aisle space
- Future expansion
- Weight and floor loading
- Electrical requirements
- Doorway sizes, elevator capacities, and loading facilities used to get the machines to their location

Figure 1 illustrates the system component cabling and includes a list of the cables and cable lengths.

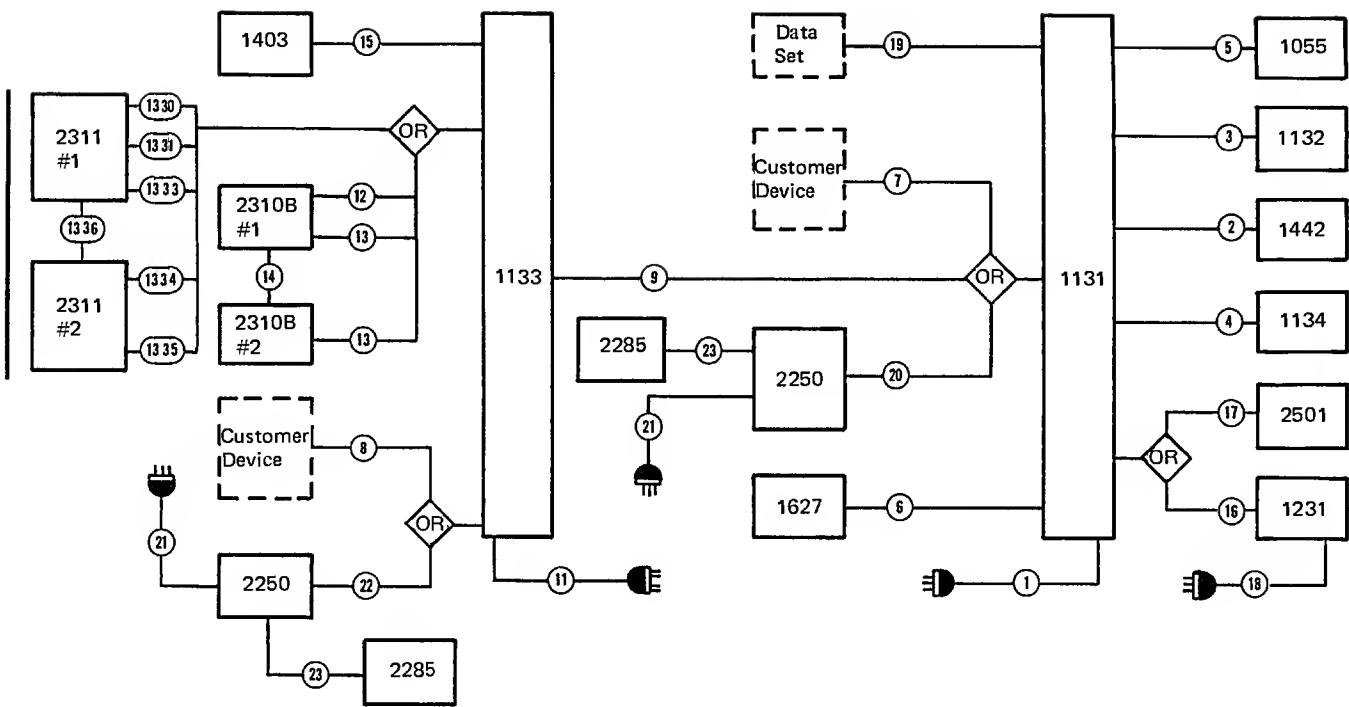
The appendixes contain a summary of the physical specifications of the 1130 system units including the required service clearances for proper servicing of the equipment by IBM Customer Engineers.

SCHEDULING

The design and implementation of a physical planning schedule assures machine-room readiness when the system is delivered. Because each 1130 system installation differs in some respect from every other installation, it is not possible to provide a precise schedule. The following schedule may be modified to meet the specific needs of a given installation.

Six Months before Delivery

1. Review the order.
2. Determine the prospective location of the system, initiate design criteria for facilities, and make a preliminary layout of the proposed installation.



⊗ Cable group number

Figure 1 (Part 1 of 2). Cable diagram and cable chart

Group No.	No. of Cables	From (Unit)	To (Unit)	Maximum Length		Standard* Length		Notes
				Feet	Meters	Feet	Meters	
1	1	Receptacle	1131	14	4,27	14	4,27	1, 2
2	2	1442	1131	15	4,57	15	4,57	1, 3
3	2	1132	1131	15	4,57	15	4,57	1, 3
4	1	1134	1131	11	3,35	11	3,35	1, 3
5	1	1055	1131	7	2,13	7	2,13	1, 3
6	1	1627	1131	12	3,66	12	3,66	11
7	1	Customer device	1131	19	5,79	—	—	4, 7, 8, 9
8	1	Customer device	1133	19	5,79	—	—	4, 7, 8, 10
9	3	1133	1131	13	3,96	13	3,96	4
11	1	Receptacle	1133	14	4,27	14	4,27	1, 3
12	2	2310B #1	1133	—	—	13	3,96	5
13	1	2310B	1133	13	3,96	13	3,96	—
14	2	2310B #2	2310B #1	—	—	5	1,52	5
15	3	1403	1133	21	6,40	21	6,40	—
16	1	1231	1131	25	7,62	25	7,62	6
17	2	2501	1131	25	7,62	20	6,10	6
18	1	Receptacle	1231	8	2,44	8	2,44	1, 3
19	1	Data set	1131	40	12,19	25	7,62	12
20	2	2250	1131	13	3,96	13	3,96	4
21	1	Receptacle	2250	14	4,27	14	4,27	1, 3
22	2	2250	1133	13	3,96	13	3,96	4
23	5	2285	2250	5	1,52	5	1,52	1, 3
1330	1	2311 #1	1133	25	7,62	25	7,62	—
1331	1	2311 #1	1133	25	7,62	25	7,62	13
1333	1	2311 #1	1133	25	7,62	25	7,62	—
1334	1	2311 #2	1133	25	7,62	25	7,62	—
1335	1	2311 #2	1133	25	7,62	25	7,62	—
1336	1	2311 #2	2311 #1	25	7,62	25	7,62	14

Notes.

- Available only at length shown.
- Ac power cord (cable group 1) to 1131 not used when 1133 is installed. When 1133 is not installed, ac power cord (cable group 1) must be ordered.
- Cables are shipped with "from unit" (or "to unit" if "from unit" is a receptacle). Do not include these cables on cable order form.
- Only one device can be connected via the storage access channel. Thus, either an 1133 (cable group 9), the 2250 (cable group 20, or a customer device (cable group 7) can be connected to the 1131. Similarly, either the 2250 (cable group 22) or a customer device (cable group 8) can be connected to the 1133 (SAC II). Cable group 7 can be substituted for cable group 8 and cable group 20 can be substituted for cable group 22 when adding an 1133 to an installed system.
- Maximum length of cable group 12 plus cable group 14 must not exceed 21 feet.
- Only one 1231 or one 2501 may be installed.
- Customer purchase only.
- Cable length is measured from cable floor entry at 1131 or 1133 to connector at end of cable. Maximum length must be reduced by wire circuit dimension from mating receptacle to circuit component in customer device. (See IBM 1130 OEMI, GA26-3645.)
- Use with feature code 7490.
- Use with feature code 7492.
- Cable group 6 (1627 to 1131) available only at maximum length shown. It must be specified on cable order form when supplied by an IBM manufacturing plant in the U.S.A. All other IBM manufacturing plants will automatically ship this cable when 1627 is ordered.
- Feature code 7690 must be ordered.
- For 50 hertz machines, use cable group 1337 in place of 1331.
- For 50 hertz machines, use cable group 1338 in place of 1336.
- * The standard cable lengths listed allow an efficient layout of most system configurations. All IBM manufacturing plants (except those in the U.S.A.) ship these lengths unless a cable order is received no less than 120 days prior to scheduled delivery; for cables to be provided by an IBM manufacturing plant in the U.S.A., a cable order covering all cables required (standard or custom lengths) must be submitted by an IBM branch office.

Figure 1 (Part 2 of 2). Cable diagram and cable chart

Four Months before Delivery

This is a critical point in the schedule. The final layout should be determined and approved by the customer and by the IBM branch manager. If building alterations, such as painting, plastering, or expansion of electrical service, are necessary, the drawings and specifications for them should be complete and ready for the work to begin.

No further changes that affect cable lengths should be made in the layout. A cable order form (Form 120-1696) must be received by the IBM plant of order control at this time.

One Week before Delivery

All installation elements pertaining to environmental and power requirements should be reviewed and tested. Lighting, floor ramps, painting, plastering, decorating, etc., should also be completed at this time. Installation and testing of all early-delivery items should be completed.

ENVIRONMENTAL REQUIREMENTS

Ambient Air Conditions

All IBM 1130 Computing Systems use air for internal cooling. Cool air is introduced through the bottom or side of each unit, internally circulated by fans or natural convection, and exhausted to the room from the top. The following limits should be maintained for ambient air to ensure normal operation of the system:

Temperature: 60°F to 90°F

Relative humidity: 10% to 80%

Maximum wet bulb temperature: 78°F

Recommended design conditions for optimum system operation and personnel comfort are 75°F (24°C) and 40 to 50% relative humidity.

A summary of the specifications for the individual units is given in Appendix A or Appendix B, depending on whether U.S. or metric units are desired.

Dust and Dirt Control

The amount of contamination in the office atmosphere will not normally interfere with the operation of the 1130 system. Normal precautions should be taken, however, to keep dust, dirt, and other foreign matter away from the machine area.

Fire Protection Equipment

Portable carbon-dioxide fire extinguishers of suitable size should be provided in the computing system area, subject to local building-code and fire-insurance requirements. A nonwetting fire-extinguishing agent for electrical equipment (Class C hazard) is recommended.

CABLES

IBM provides the necessary inter-unit signal and power cables for proper connection to the 1130 system.

Cable length limitations and routing listed in Figure 1 are available to the customer at no extra charge, except for those cables listed as customer purchase only. Cable lengths longer than the maximum specified can be considered on an RPQ* basis.

Cable lengths are determined by measuring the distance along the cable route from the floor or other mounting surface point of entry of a unit to the corresponding point of entry of the connecting unit. When a raised floor or raceway floor is used, twice the height of the floor must be added to the measured length.

Exposed interconnecting cables should be protected so that they do not present a safety hazard and are not readily damaged. This protection can consist of ramps, raceways with removable covers, or a raised floor.

Synchronous Communications Adapter

The synchronous communications adapter (SCA) special feature enables the IBM 1130 Computing System to function as a point-to-point or multipoint data transmission terminal, using either private or commercial common-carrier line transmission facilities. The adapter sends data to or receives data from the line transmission facilities under control of the stored program in the 1130. It operates on an interrupt-request basis similar to that used by other input/output devices in the IBM 1130 Computing System.

The synchronous communications adapter cable (cable 19) routing is shown in Figure 1.

For more information on the SCA, refer to *IBM 1130 Functional Characteristics*, GA26-5881.

IBM FIELD ENGINEERING REQUIREMENTS

Proper servicing of the 1130 system requires adequate service clearances around each unit of the system. These clearances are listed under the specifications list for the individual unit.

Space should be provided near the operating area for storage of test equipment and spare parts. At least one duplex 115/120V ac grounding type convenience outlet should be located in this area.

*Request for price quotation from IBM

Storage Access Channel

The storage access channel (SAC) feature provides a means for external devices or systems to communicate directly with the 1131 CPU core storage. Additional I/O devices or systems can be added by attaching the 1133 Multiplex Control to the SAC channel. As a special feature, the 1133 has provisions for an extra channel (SAC II), which can accommodate other I/O devices or systems.

Communication with core storage from an external device is on either a cycle-steal or an interrupt basis, and is initiated by the external device when the device is ready to communicate. For more information on SAC, refer to *IBM 1130 Computing System Storage Access Channel Original Equipment Manufacturers' Information*, GA26-3645.

Storage Access Channel Cable

Cable assembly part number 2243004 (includes a connector on each end) may be purchased from IBM for attachment of a customer device to the storage access channel (cable group number 7 or 8).

The data, address, and control lines are brought out through a 160-pin receptacle in the 1131 or 1133.

A detailed diagram of the plug and receptacle is shown in Figure 2. For pin designations, spare lines, and point-to-point wiring, refer to the *IBM 1130 SAC OEMI*, GA26-3645.

Specifications of the storage access channel cable follow.

Number of conductors. 182 (91 twisted pairs).

One twist every 1" ± 0.12 "

Cable diameter. 1.20" nominal

Cover type. Polyvinyl chloride, 5/64" nominal thickness

Shielding. Tinned copper braid for 90% minimum coverage

Cable lay-up. 1-6-12-18-24-30

Individual conductor characteristics.

Quantity: 182 (91 twisted pairs)

Maximum outside diameter: 0.054"

AWG size: 22

Conductor material: stranded copper

Insulation material: semirigid polyvinyl chloride

Insulation thickness: 0.009" nominal

UL voltage rating: 300 volts

Insulation temperature rating: 80°C (176°F)

The external shielding must be connected only to CPU ground through position L3 of the 160-pin receptacle for the SAC.

Coupled Noise

The maximum level for noise coupled onto any signal line must not exceed 300 millivolts.

Cable Resistance

The maximum cable resistance, with customer device attached and including contact resistance, must not exceed 26 ohms.

Cable Length

The maximum length must not exceed 25 feet. Since 6 feet is required for connection in the 1131 or 1133, the available length to the customer is 19 feet. This length is measured from cable floor entry at the 1131 or 1133 to the connector at the end of the cable. The customer length (19 feet) must be reduced by the wire circuit dimensions from the mating receptacle to the circuit component in the customer device.

Power Sequence for Storage Access Channel Devices

Customer devices attached to the storage access channel (SAC or SAC II) should not be turned on or off except when the CPU is off or in single-step mode.

It is recommended that non-IBM devices connected to the 1130 system via the storage access channel (SAC or SAC II) be powered from an ac source having the same voltage as the ac source for the 1130 system.

POWER REQUIREMENTS

Power Supply

Electrical requirements for the IBM 1130 Computing System depend on the system configuration and auxiliary equipment used. See "Unit Specifications" for voltage requirements.

The voltage and frequency specifications for the 1130 system are:

1. 115V ac ($\pm 10\%$); 60 Hz (± 0.5 Hz); single-phase; three-wire (one phase, one neutral, and one grounding conductor).
2. 208 or 230V ac ($\pm 10\%$); 60 Hz (± 0.5 Hz); single-phase; three-wire (two phase and one grounding conductor).
3. 208 or 230V ac ($+10\%$, -8%); 60 Hz (± 0.5 Hz); three-phase; four-wire (three phase and one grounding conductor).
4. 195, 220, or 235V ac ($\pm 10\%$); 50 Hz (± 0.5 Hz); single-phase; three-wire (one phase, one neutral, and one grounding conductor).*
5. 195 delta, 220 delta/380 wye, or 235 delta/408 wye volts ac ($+10\%$, -8%); 50 Hz (± 0.5 Hz); three-phase; four-wire delta (three phase and one grounding conductor); five-wire wye (three phase, one neutral, and one ground).*

*Available for use in countries where 50-hertz power distribution systems are used.

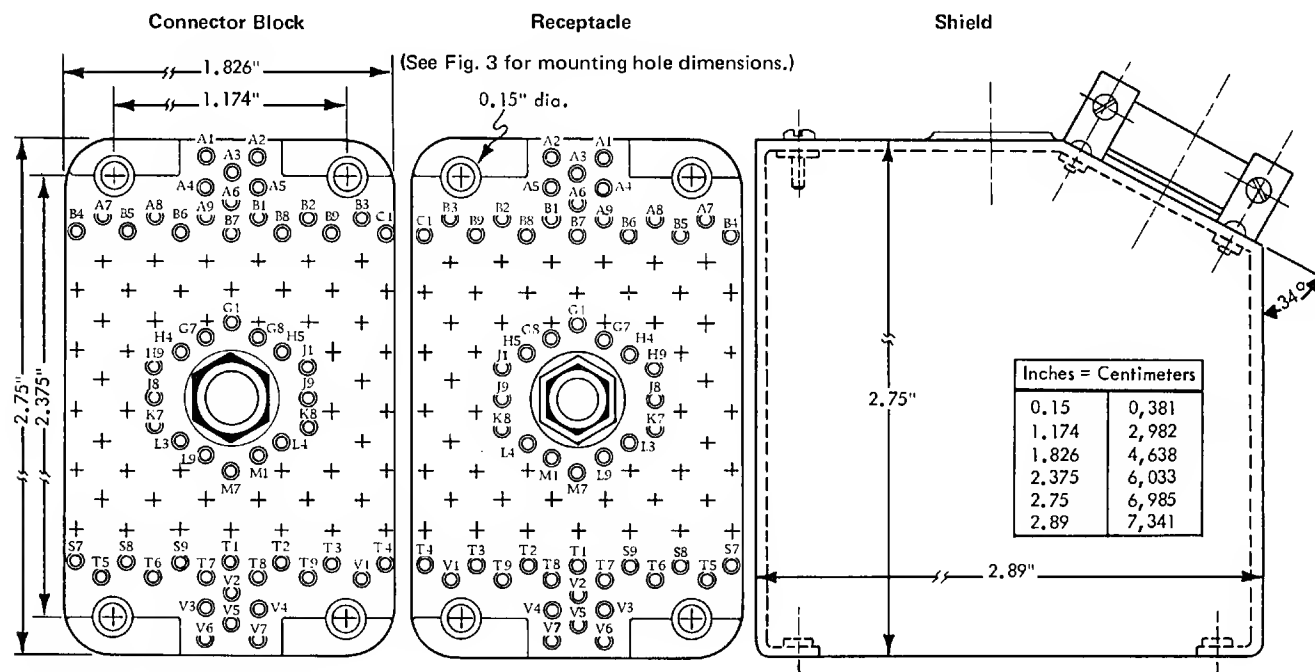
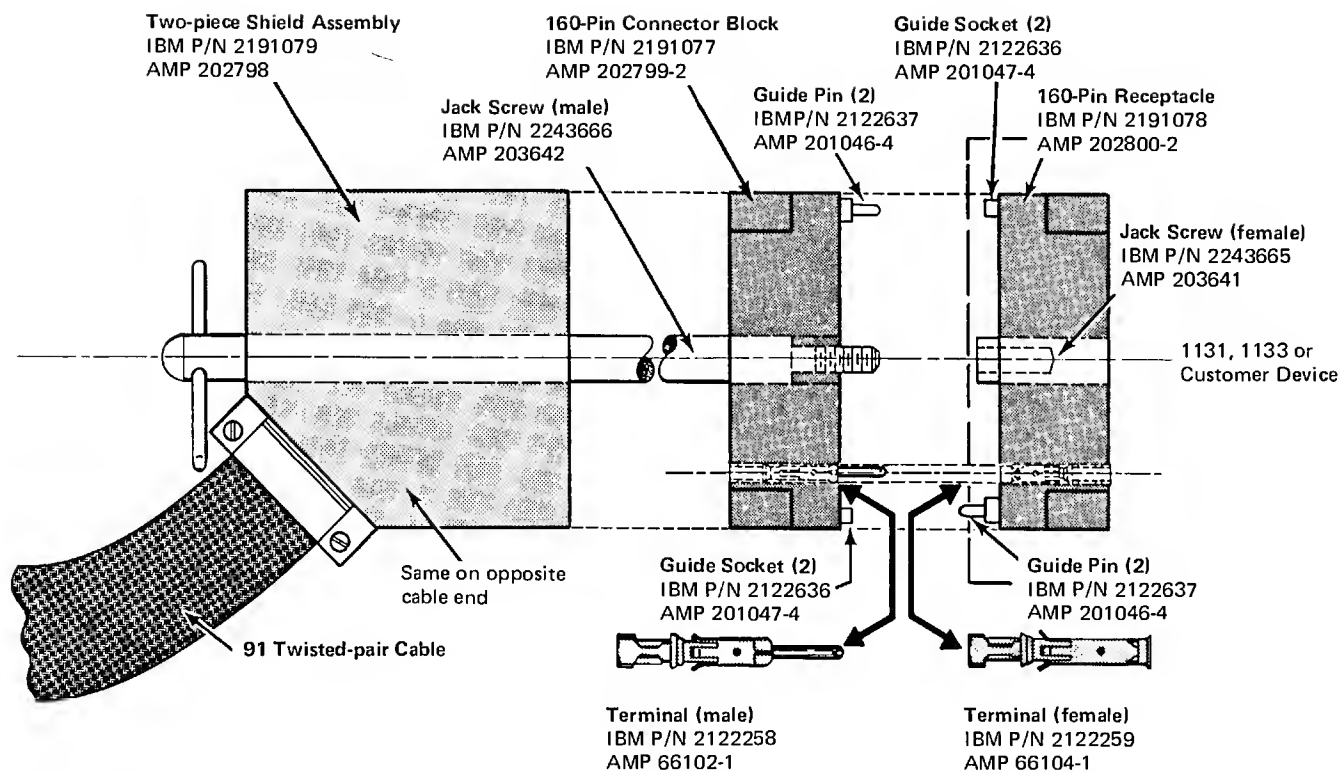


Figure 2. Storage access channel connector

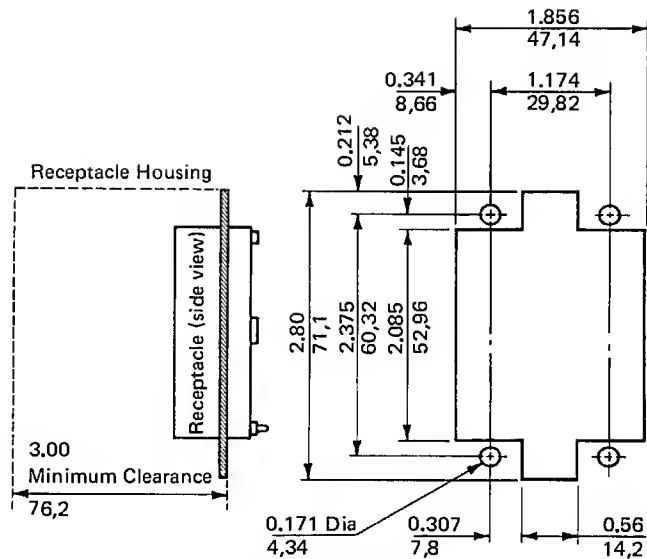


Figure 3. Receptacle mounting dimensions

Power Distribution

All power to the 1130 system should be supplied through a single feeder, protected by a mainline circuit breaker. Individual branch circuits from the distribution panel should be protected by circuit breakers suitable for motor load application and derated according to the manufacturer's specifications.

The distribution panel should be located in an unobstructed and well-lighted area within the computer room. As a safety precaution, a remote circuit breaker, which can remove all power from the computer system, should be provided in the machine room. Any customer-supplied device interconnected with the 1130 system should have its branch circuit protection device interlocked with the mainline circuit breaker.

Phase Rotation

The three-phase power receptacles for use with the system must be wired for correct phase rotation. Looking at the face of the receptacle, and running counterclockwise from the ground pin, the sequencing will be phase 1, phase 2, and phase 3.

Convenience Outlets

A suitable number of grounded convenience outlets should be installed in the computer room and Customer Engineer room for use by building maintenance personnel, porter service, Customer Engineers, etc.

Grounding

A green-wire grounding conductor is supplied in each power cord. Each customer-supplied branch circuit should have an insulated wire conductor for the purpose of grounding equipment. All branch-circuit grounding wires should be tied to a common ground point at the distribution panel, and a single insulated grounding wire run from the distribution panel to the nearest suitable grounding station. Conduit must not be used as the only grounding means. Unless otherwise required by local codes, the grounded neutral conductor must be electrically isolated from the system grounding conductor except at the building grounding station. IBM Installation Planning Representatives should be consulted for further details.

Lightning Protection

It is recommended that the customer install lightning protection on his secondary power source when any of the following conditions exists:

1. The utility company installs lightning protectors on the primary.
2. Primary power is supplied by an overhead power service.
3. The area is subject to electrical storms or equivalent power surges.



This section contains plan views for each of the units in the system.

The plan views illustrated for each unit use these symbols:



Caster



Floor leveler



IBM cable entry



Floor level cable exit

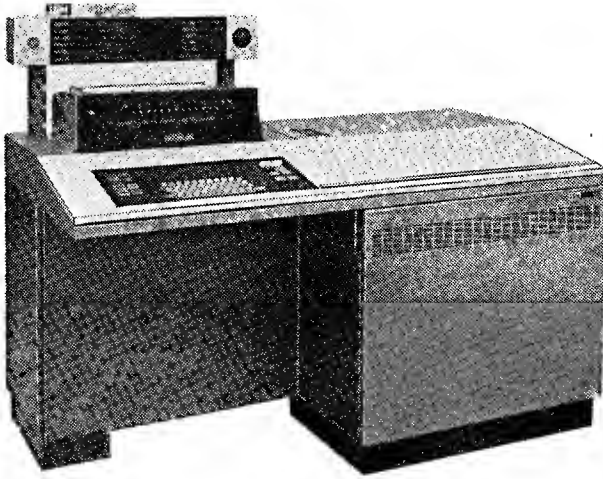


Usage meter

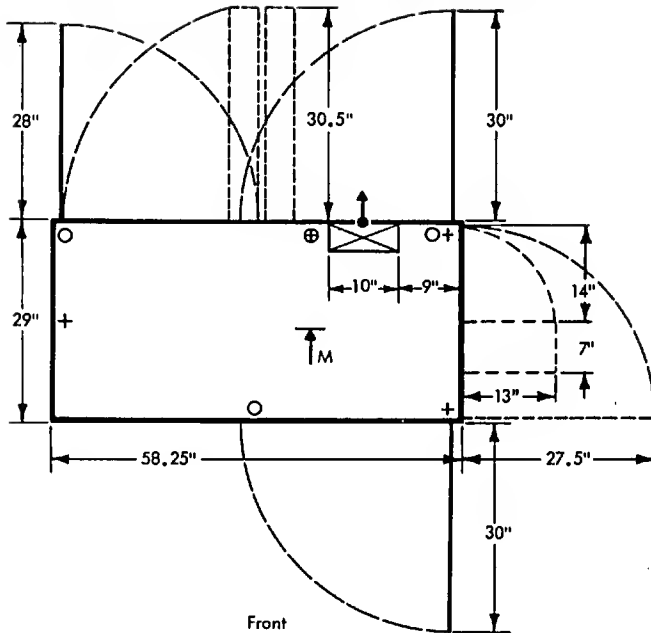


CE panel

**IBM 1131 CENTRAL PROCESSING UNIT
MODELS 1A, 1B, 2A, 2B, 4A, AND 4B**



BR2683



Inches	=	Centimeters
9.0		22,86
10.0		25.40
27.5		69,85
28.0		71,12
29.0		73,66
30.0		76,20
30.5		77,47
58.25		147,96

Dimensions

Width	58.25 in. (147,5 cm)
Depth	29 in. (73,7 cm)
Height	45.5 in. (115,6 cm)

Service Clearances

Front	42 in. (106,7 cm)
Rear	36 in. (91,4 cm)
Left	—
Right	30 in. (76,2 cm)

Maximum Weight	760 lb (345 kg)
----------------	-----------------

Heat Output/Hour	3100 BTU (781 kcal)
------------------	---------------------

Air Flow	720 cfm (21 m ³ /min) maximum
----------	--

Electrical Requirements (115V)*

Voltage	115V \pm 10%
Frequency	60 \pm 0.5 Hz
Phase	1
kVA	1.1
Plug	Arrow Hart 5717**
Receptacle	Arrow Hart 5716**

Electrical Requirements (208/230V)***

Voltage	208/230V \pm 10%
Frequency	60 \pm 0.5 Hz
Phase	1
kVA	1.1
Plug	Russell and Stoll FS3720
Receptacle	Russell and Stoll FS3743
Connector	Russell and Stoll FS3913

Operating Environment

Temperature	60° to 90° F (15.6° to 32.2° C)
Relative humidity	10% to 80%
Maximum wet bulb	78° F (25.6° C)

Nonoperating Environment

Temperature	50° to 110° F (10° to 43° C)
Relative humidity	8% to 80%
Maximum wet bulb	80° F (26.7° C)

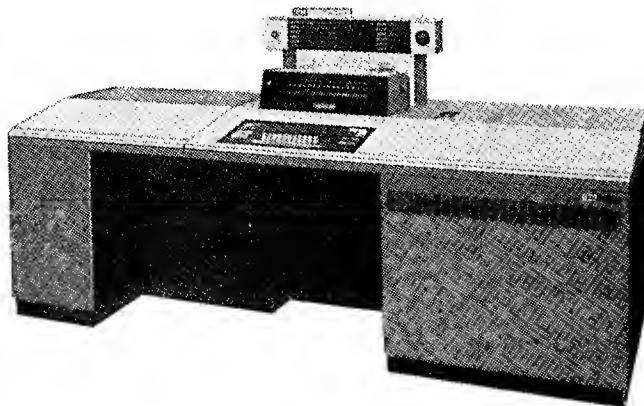
Notes.

* Measure voltage at receptacle before connecting power cord to be sure correct voltage exists.

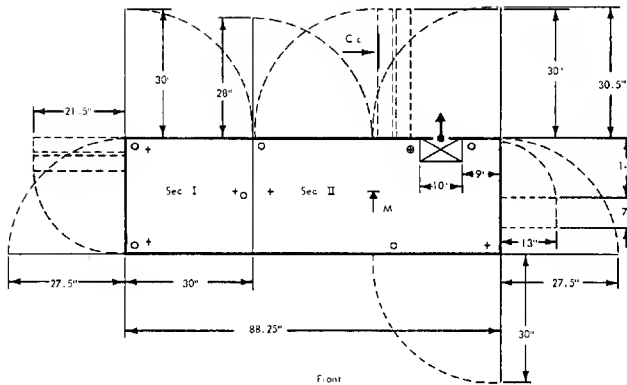
** All 115-volt machines shipped after January 1, 1968 are equipped with Arrow Hart (5717) plugs. Machines shipped prior to that date use Hubbell (9338) plugs.

*** Power is supplied by the 1133 if installed.

**IBM 1131 CENTRAL PROCESSING UNIT MODELS
1C, 1D, 2C, 2D, 3B, 3C, 3D, 5B, 5C, AND 5D**



BR2682



Inches	=	Centimeters
9.0		22.86
10.0		25.40
21.5		54.61
27.5		69.85
28.0		71.12
30.0		76.20
30.5		77.47
88.25		224.16

Dimensions

Width	88.25 in.* (224,8 cm)
Depth	29 in. (73,7 cm)
Height	45.5 in. (115,6 cm)

Service Clearances

Front	42 in. (106,7 cm)
Rear	36 in. (91,4 cm)
Left	30 in. (76,2 cm)
Right	30 in. (76,2 cm)

Maximum Weight	1050 lb (477 kg)
----------------	------------------

Heat Output/Hour	4200 BTU (1058 kcal)
------------------	----------------------

Air Flow	1000 cfm (28,3 m ³ /min) maximum
----------	---

Electrical Requirements (208/230V)**

Voltage	208/230V ±10%
Frequency	60 ±0.5 Hz
Phase	1
kVA	1.5
Plug	Russell and Stoll FS3720
Receptacle	Russell and Stoll FS3743
Connector	Russell and Stoll FS3913

Operating Environment

Temperature	60° to 90° F (15.6° to 32.2° C)
Relative humidity	10% to 80%
Maximum wet bulb	78° F (25.6° C)

Nonoperating Environment

Temperature	50° to 110° F (10° to 43° C)
Relative humidity	8% to 80%
Maximum wet bulb	80° F (26.7° C)

Notes.

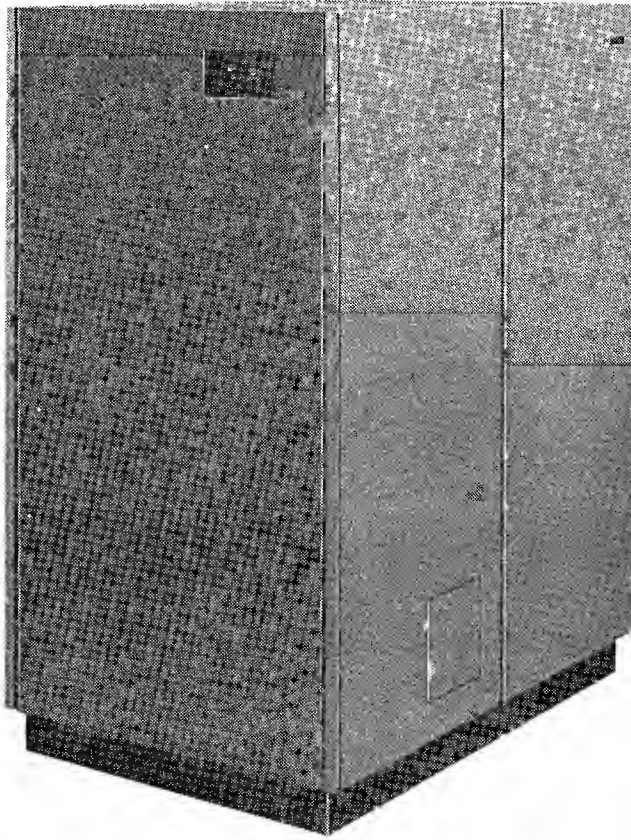
*Shipped in two sections.

Sec I: 290 lb (131,5 kg).

Sec II: 760 lb (345,7 kg).

**Power is supplied by the 1133 if installed.

IBM 1133 MULTIPLEX CONTROL ENCLOSURE



BR0001

Dimensions

Width	32 in. (81,3 cm)
Depth	45.50 in. (115,6 cm)
Height	60 in. (152,4 cm)

Service Clearances

Front	30 in. (76,2 cm)
Rear	30 in. (76,2 cm)
Left	42 in. (106,7 cm)
Right	30 in. (76,2 cm)

Maximum Weight	1100 lb (499 kg)
----------------	------------------

Heat Output/Hour	3400 BTU (857 kcal)
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Air Flow	500 cfm (14,2 m ³ /min) maximum
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Electrical Requirements (208/230V)

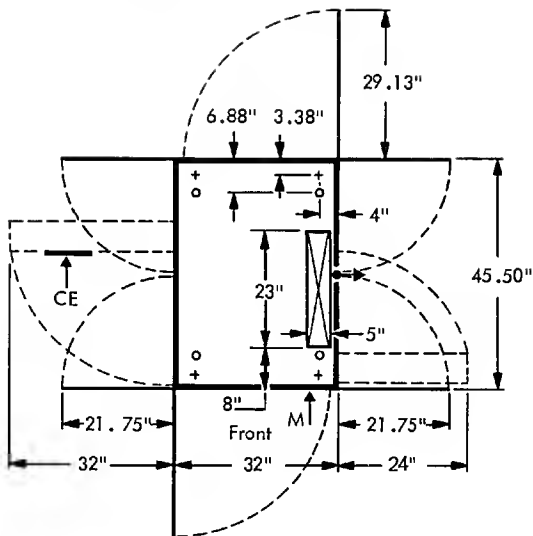
Voltage	208/230V +10% to -8%
Frequency	60 ±0.5 Hz
Phase	3
kVA	1.1
Plug	Russell and Stoll FS3760
Receptacle	Russell and Stoll FS3754
Connector	Russell and Stoll FS3934

Operating Environment

Temperature	60° to 90° F (15.6° to 32.2° C)
Relative humidity	10% to 80%
Maximum wet bulb	78° F (25.6° C)

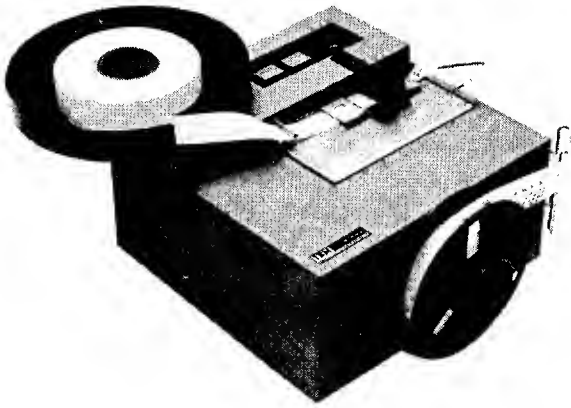
Nonoperating Environment

Temperature	50° to 110° F (10° to 43° C)
Relative humidity	8% to 80%
Maximum wet bulb	80° F (26.7° C)

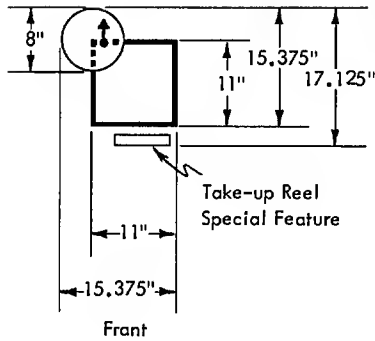


Inches	=	Centimeters
3.38		8,59
4.0		10,16
5.0		12,70
6.88		17,48
8.0		20,32
21.75		55,25
23.0		58,42
24.0		60,96
29.13		74,00
32.0		81,28
45.5		115,57

IBM 1055 PAPER TAPE PUNCH



BR2687



Inches	=	Centimeters
8.0		20,32
11.0		27,94
15.37		39,04
17.12		43,49

Dimensions

Width*	15.375 in. (39 cm)
Depth	17.125 in. (44 cm)
Height	8.25 in. (21 cm)

Service Clearances

Front	12 in. (30 cm)
Rear	12 in. (30 cm)
Left	12 in. (30 cm)
Right	12 in. (30 cm)

Maximum Weight	26 lb (12 kg)
----------------	---------------

Heat Output/Hour	150 BTU (38 kcal)
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Air Flow	0 cfm (0 m ³ /min) maximum
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Electrical Requirements**

kVA	0,06
Phase	1

Operating Environment

Temperature	50° to 110° F (10° to 43° C)
Relative humidity	10% to 80%
Maximum wet bulb	80° F (27° C)

Nonoperating Environment

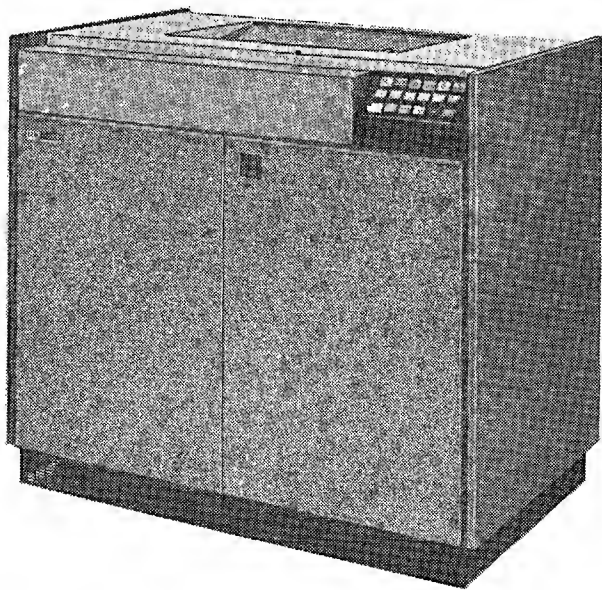
Temperature	50° to 110° F (10° to 43° C)
Relative humidity	10 % to 80%
Maximum wet bulb	80° F (27° C)

Notes.

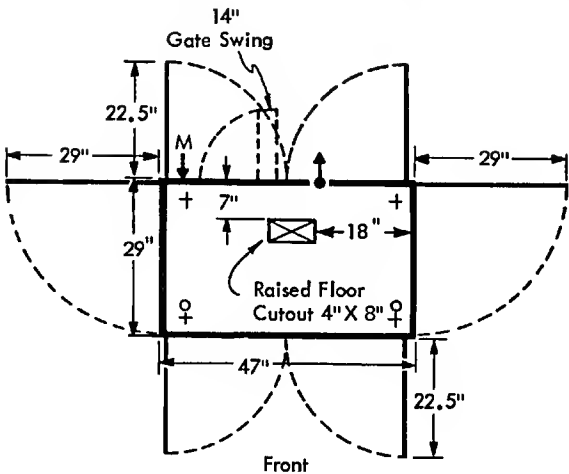
*With tape reels.

**Power is supplied by the 1131.

IBM 1132 PRINTER MODELS 1 AND 2



BR2688



Inches	=	Centimeters
4.0		10,16
7.0		17,78
8.0		20,32
14.0		35,56
22.5		57,16
29.0		73,66
47.0		119,38

Dimensions

Width	47 in. (119,4 cm)
Depth	29.50 in. (74,9 cm)
Height	42 in. (106,7 cm)

Service Clearances

Front	36 in. (91,4 cm)
Rear	30 in. (76,2 cm)
Left	30 in. (76,2 cm)
Right	30 in. (76,2 cm)

Maximum Weight	700 lb (318 kg)
----------------	-----------------

Heat Output/Hour	1300 BTU (328 kcal)
------------------	---------------------

Air Flow	80 cfm (2 m ³ /min) maximum
----------	--

Electrical Requirements*

kVA	0.5
Phase	1

Operating Environment

Temperature	60° to 90° F (15.6° to 32.2° C)
Relative humidity	10% to 80%
Maximum wet bulb	78° F (25.6° C)

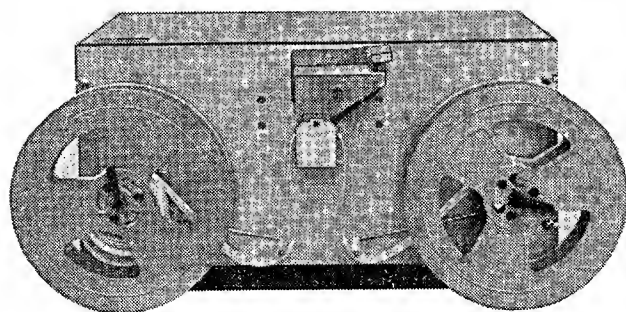
Nonoperating Environment

Temperature	50° to 110° F (10° to 43° C)
Relative humidity	8% to 80%
Maximum wet bulb	80° F (26.7° C)

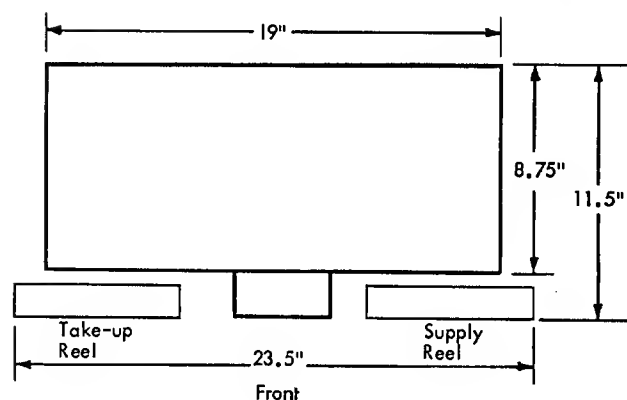
*Notes.

1. Power is supplied by the 1131.
2. Voltage specified must be compatible with 1131. For field conversion, order required change via no-charge MES.

IBM 1134 PAPER TAPE READER



BR2686



Inches	=	Centimeters
8.75		22,23
11.50		29,21
19.00		48,26
23.50		59,69

Dimensions

Width	23,5 in. (59,7 cm)
Depth	11,50 in. (29,20 cm)
Height	10 in. (25,4 cm)

Service Clearances

Front	30 in. (76,2 cm)
Rear	12 in. (30,5 cm)
Left	6 in. (15,2 cm)
Right	6 in. (15,2 cm)

Maximum Weight	15 lb (7 kg)
----------------	--------------

Heat Output/Hour	150 BTU (38 kcal)
------------------	-------------------

Air Flow	0 cfm (0 m ³ /min) maximum
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Electrical Requirements*

kVA	0.06
Phase	1

Operating Environment

Temperature	60° to 90° F (15.6° to 32.2° C)
Relative humidity	10% to 80%
Maximum wet bulb	80° F (26.7° C)

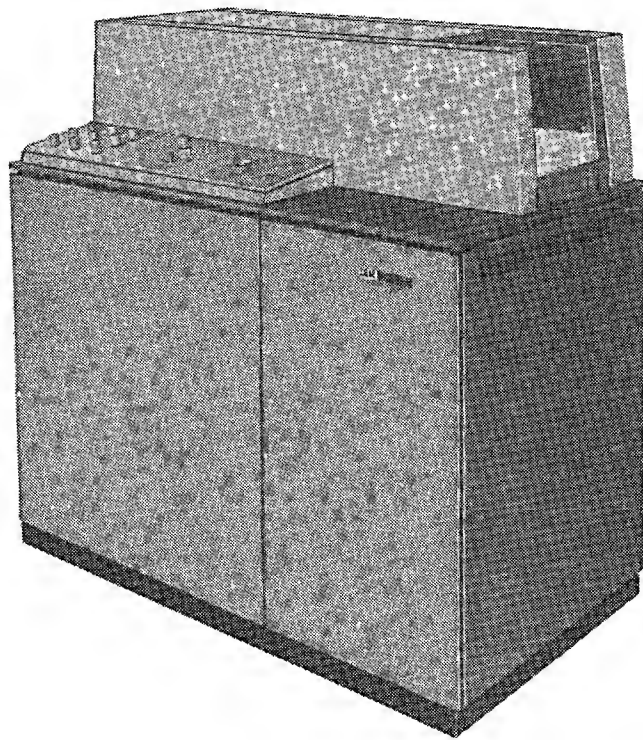
Nonoperating Environment

Temperature	60° to 90° F (15.6° to 32.2° C)
Relative humidity	10% to 80%
Maximum wet bulb	80° F (26.7° C)

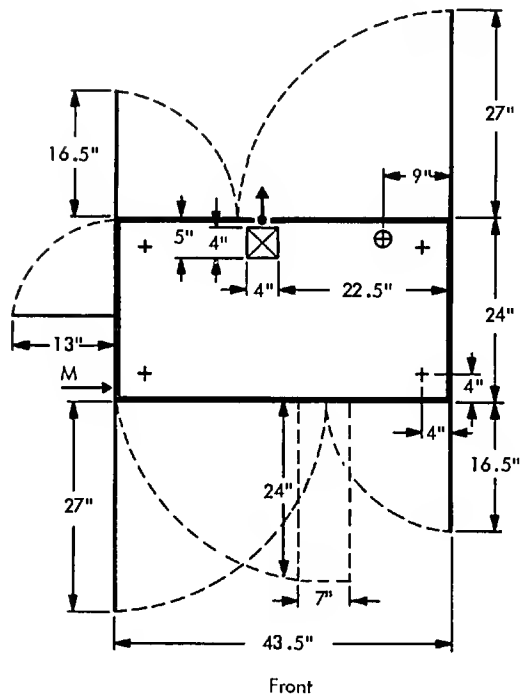
Note.

*Power supplied by the 1131.

IBM 1231 OPTICAL MARK PAGE READER MODEL 1



BR2693



Dimensions

Width	43.5 in. (113 cm)
Depth	24 in. (61 cm)
Height	44.75 in. (114 cm)

Service Clearances

Front	42 in. (107 cm)
Rear	42 in. (107 cm)
Left	36 in. (91 cm)
Right	30 in. (76 cm)

Maximum Weight	620 lb (281 kg)
----------------	-----------------

Heat Output/Hour	3700 BTU (932 kcal)
------------------	---------------------

Air Flow	300 cfm (8 m ³ /min) maximum
----------	---

Electrical Requirements (208/230V) *

Voltage	208/230V $\pm 10\%$
Frequency	60 ± 0.5 Hz
Phase	1
kVA	1.2
Plug	Russell and Stoll FS3720
Receptacle	Russell and Stoll FS3743
Connector	Russell and Stoll FS3913

Operating Environment

Temperature	50° to 110° F (10° to 43° C)
Relative humidity	8% to 80%
Maximum wet bulb	85° F (29.4° C)

Nonoperating Environment

Temperature	50° to 110° F (10° to 43° C)
Relative humidity	8% to 80%
Maximum wet bulb	85° F (29.4° C)

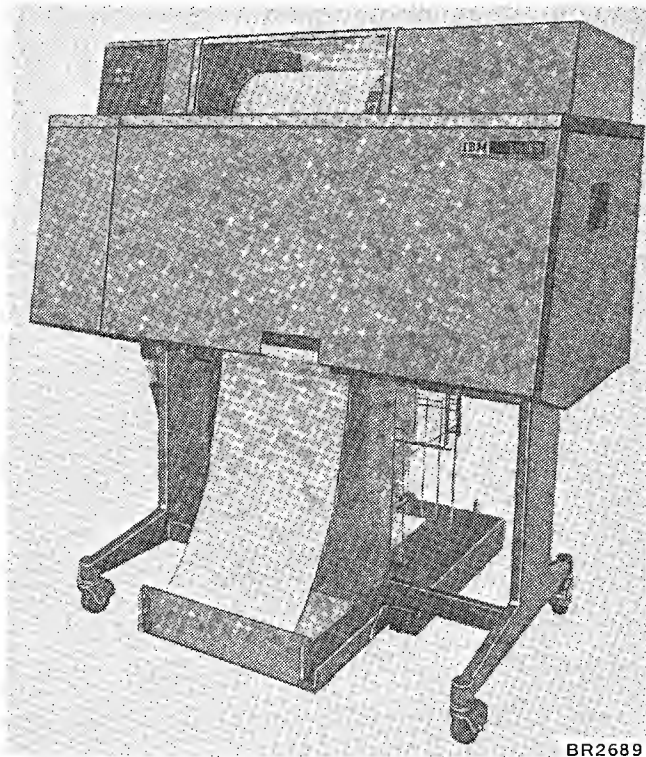
Note.

*1131 must be 208/230V.

Inches = Centimeters

4.0	10,16
5.0	12,70
7.0	17,78
9.0	22,86
13.0	33,02
16.5	41,91
22.5	57,16
24.0	60,96
27.0	68,58
43.5	110,49

IBM 1403 PRINTER MODELS 6 AND 7



BR2689

Dimensions

Width	47.75 in. (121 cm)
Depth	28.50 in. (72 cm)
Height	53.25 in. (135 cm)

Service Clearances

Front	36 in. (91 cm)
Rear	36 in. (91 cm)
Left	30 in. (76 cm)
Right	30 in. (76 cm)

Maximum Weight	750 lb (340 kg)
----------------	-----------------

Heat Output/Hour	2500 BTU (630 kcal)
------------------	---------------------

Air Flow	310 cfm (9 m ³ /min) maximum
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Electrical Requirements*

kVA	1.0
Phase	3

Operating Environment

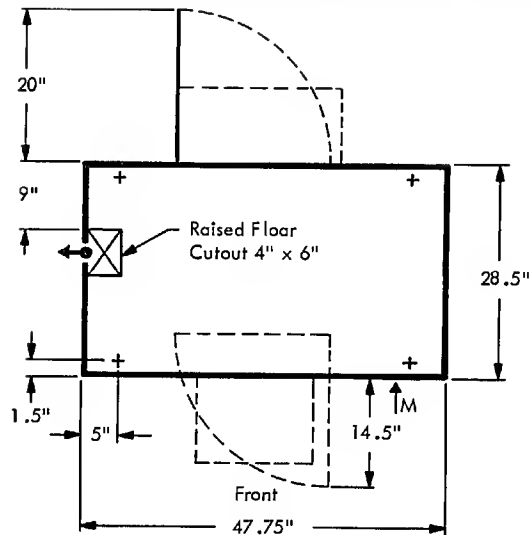
Temperature	60° to 90° F (15.6° to 32.2° C)
Relative humidity	20% to 80%
Maximum wet bulb	78° F (25.6° C)

Nonoperating Environment

Temperature	50° to 110° F (10° to 43° C)
Relative humidity	0% to 80%
Maximum wet bulb	80° F (26.7° C)

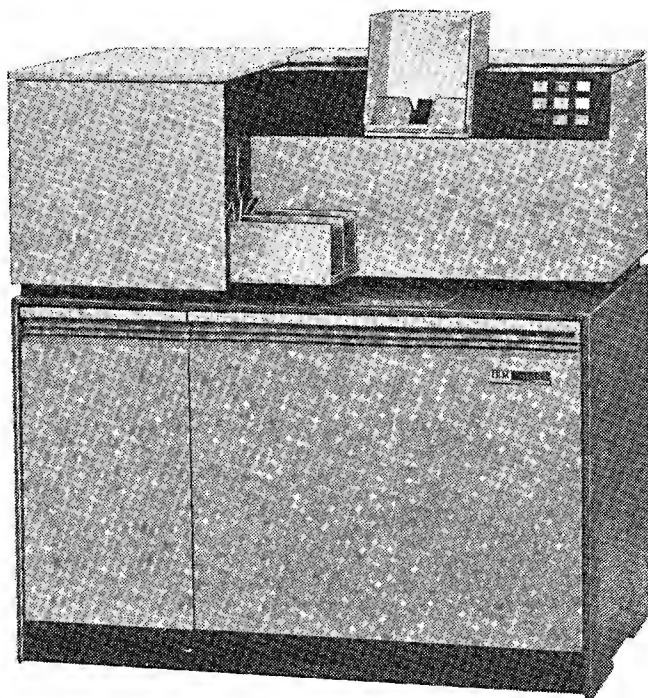
Note.

*Power is supplied by the 1133.



Inches	=	Centimeters
4.0		10,16
5.0		12,70
6.0		15,24
9.0		22,86
11.5		29,21
14.5		36,83
20.0		50,80
28.5		72,39
47.75		121,29

IBM 1442 CARD PUNCH MODEL 5
IBM 1442 CARD READ PUNCH MODELS 6 AND 7



BR2684

Dimensions

Width	43 in. (109 cm)
Depth	24 in. (61 cm)
Height	49 in. (124 cm)

Service Clearances

Front	36 in. (91 cm)
Rear	30 in. (76 cm)
Left*	18 in. (46 cm)
Right	6 in. (15 cm)

Maximum Weight 525 lb (238 kg)

Heat Output/Hour 1800 BTU (454 kcal)

Air Flow 50 cfm (1 m³/min) maximum

Electrical Requirements**

kVA	0.7
Phase	1

Operating Environment

Temperature	60° to 90° F (15.6° to 32.2° C)
Relative humidity	10% to 80%
Maximum wet bulb	80° F (26.7° C)

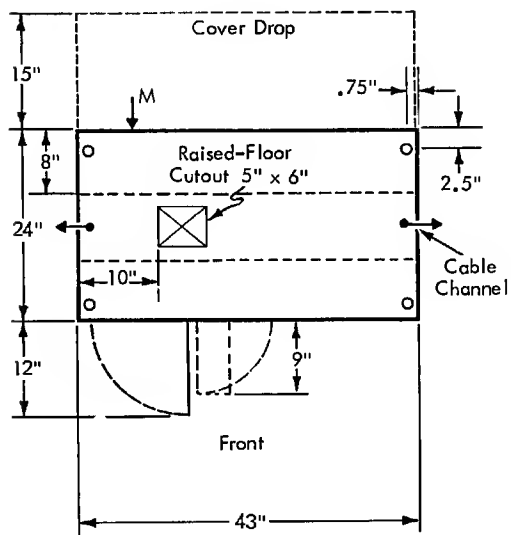
Nonoperating Environment

Temperature	50° to 110° F (10° to 43° C)
Relative humidity	0% to 80%
Maximum wet bulb	80° F (26.7° C)

Notes.

*No service clearance is required from floor level to 30" (76 cm) above floor level. Service clearance is required for the upper portion of the machine only. The 1442 can be abutted to units that do not extend more than 30" (76 cm) above the floor.

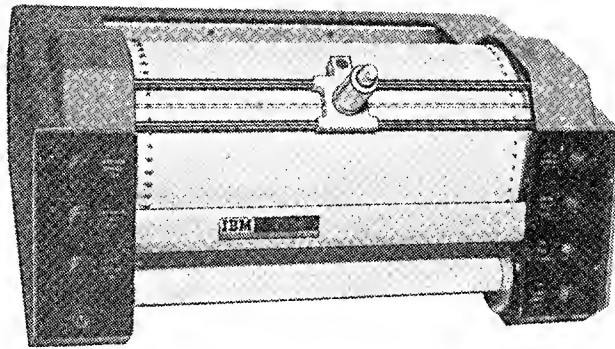
**Power is supplied by the 1131. For 1442 Model 5, 1131 must be 208/230V.



Inches = Centimeters

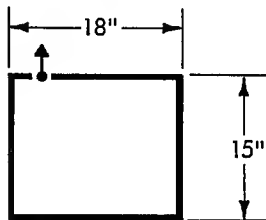
0.5	1,27
0.75	1,91
2.5	6,35
5.0	12,70
6.0	15,24
8.0	20,32
9.0	22,86
10.0	25,40
12.0	30,48
15.0	38,10
24.0	60,96
43.0	109,22

IBM 1627 PLOTTER MODELS 1 AND 2



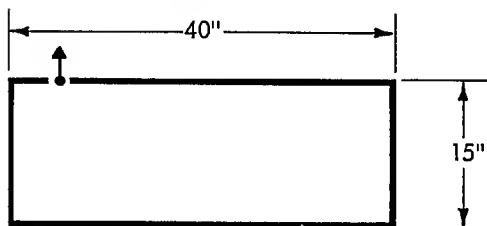
BR2692

Model 1



Front

Model 2



Front

Inches = Centimeters

15.0	38,10
18.0	45,72
40.0	101,60

Dimensions

Width	18 in. (46 cm)	} Model 1
Depth	15 in. (38 cm)	
Height	10 in. (25 cm)	

Width	40 in. (102 cm)	} Model 2
Depth	15 in. (38 cm)	
Height	10 in. (25 cm)	

Service Clearances

Front	12 in. (30 cm)
Rear	12 in. (30 cm)
Left	12 in. (30 cm)
Right	12 in. (30 cm)

Maximum Weight	33 lb (15 kg)	Model 1
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Maximum Weight	55 lb (25 kg)	Model 2
----------------	---------------	---------

Heat Output/Hour	250 BTU (63 kcal)
------------------	-------------------

Air Flow	0 cfm (0 m ³ /min) maximum
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Electrical Requirements*

kVA	0.1
Phase	1

Operating Environment

Temperature	60° to 90° F (15.6° to 32.2° C)
Relative humidity	20% to 80%
Maximum wet bulb	78° F (25.6° C)

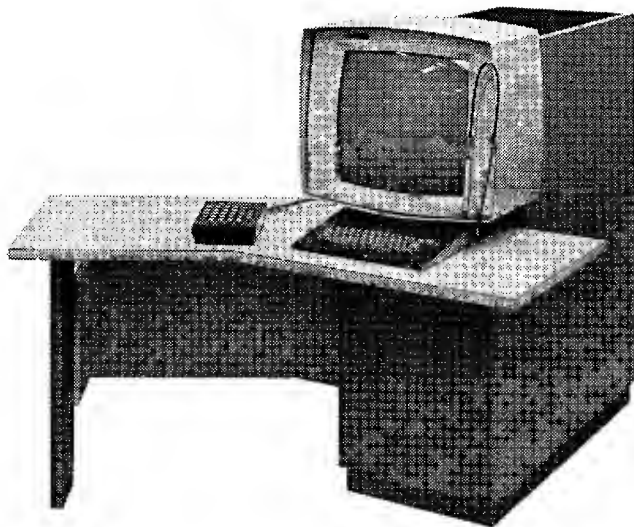
Nonoperating Environment

Temperature	50° to 110° F (10° to 43° C)
Relative humidity	0% to 80%
Maximum wet bulb	85° F (29.4° C)

Note.

*Power is supplied by the 1131.

IBM 2250 DISPLAY UNIT MODEL 4



BR2691

Dimensions

Width*	58.5 in. (149 cm)
Depth	64.5 in. (164 cm)
Height	50 in. (127 cm)

Service Clearances

Front	30 in. (76 cm)
Rear	10 in. (25 cm)
Left	40 in. (102 cm)
Right	30 in. (76 cm)

Maximum Weight	600 lb (172 kg)
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Heat Output/Hour	3,000 BTU (756 kcal)
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Air Flow	420 cfm (11,9 m ³ /min) maximum
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Electrical Requirements

Voltage	208/230V \pm 10%
Frequency	60 \pm 0.5 Hz
Phase	1
kVA	1.0
Plug	Russell and Stoll FS3720
Receptacle	Russell and Stoll FS3743
Connector	Russell and Stoll FS3913

Operating Environment

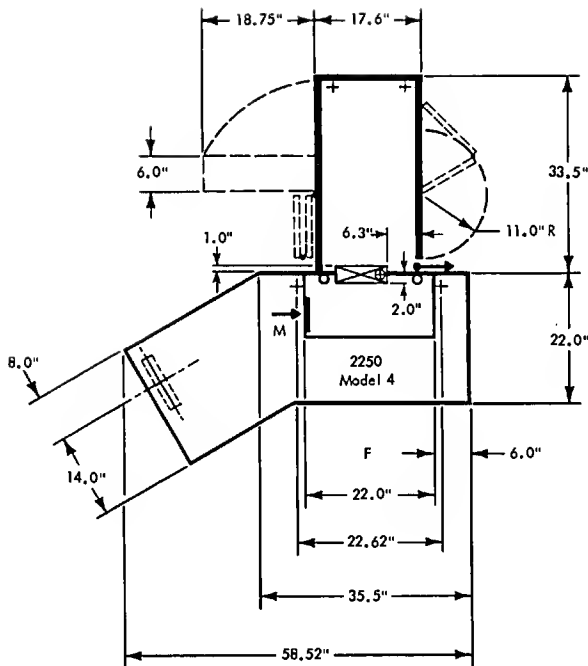
Temperature	60° to 90° F (15.6° to 32.2° C)
Relative humidity	8% to 80%
Maximum wet bulb	78° F (25.6° C)
Maximum ambient light	Recommended level at desk height— 60 foot candles Normal range at desk height— 15 to 80 foot candles

Nonoperating Environment

Temperature	50° to 110° F (10° to 43° C)
Relative humidity	8% to 80%
Maximum wet bulb	80° F (26.7° C)

Note.

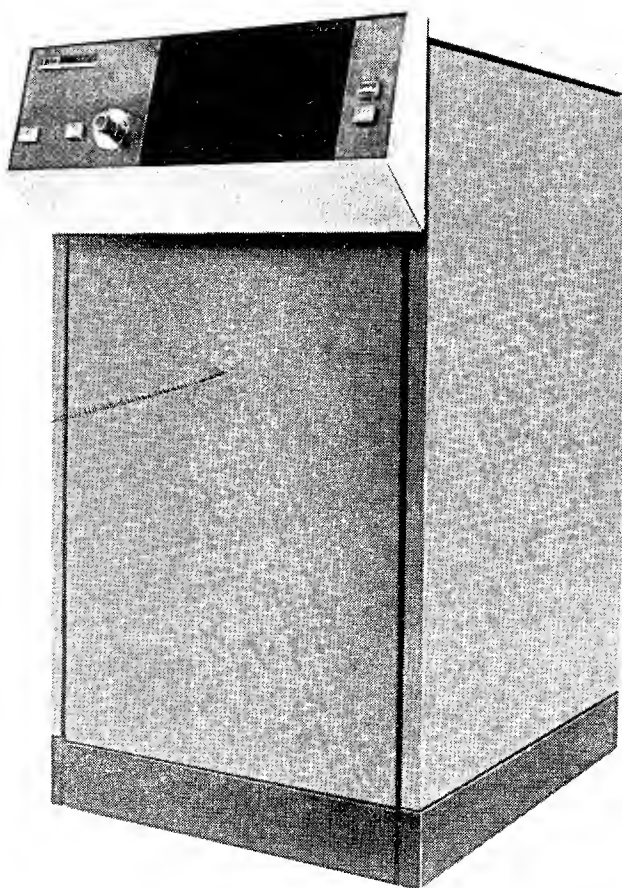
*Maximum width with reading board removed 28.5 in. (72 cm).



Inches = Centimeters

1.0	2,54
2.0	5,08
6.0	15,24
6.3	16,01
8.0	20,32
11.0	27,94
14.0	35,56
17.6	44,71
18.75	47,63
22.0	55,88
22.62	57,46
33.5	85,09
35.5	90,17
58.52	148,65

IBM 2285 DISPLAY COPIER



BR0002

Dimensions

Width	22 in. (56 cm)
Depth	30 in. (76 cm)
Height	40 in. (102 cm)

Service Clearances

Front	30 in. (76 cm)
Rear	30 in. (76 cm)
Left	30 in. (76 cm)
Right	26 in. (66 cm)

Maximum Weight	350 lb (159 kg)
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Heat Output/Hour	750 BTU (187 kcal)
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Air Flow	75 cfm (2 m ³ /min) maximum
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Electrical Requirements*

kVA	1.5
Cable limitations	length fixed at 5 feet.

Operating Environment

Temperature	60° to 90° F (15.6° to 32.2° C)
Relative humidity**	20% to 80%
Maximum wet bulb	78° F (25.6° C)

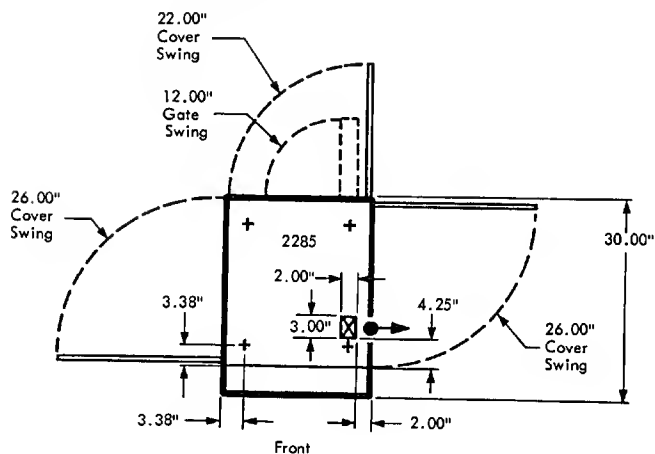
Nonoperating Environment

Temperature	50° to 110° F (10° to 43° C)
Relative humidity	8% to 80%
Maximum wet bulb	80° F (26.7° C)

Notes.

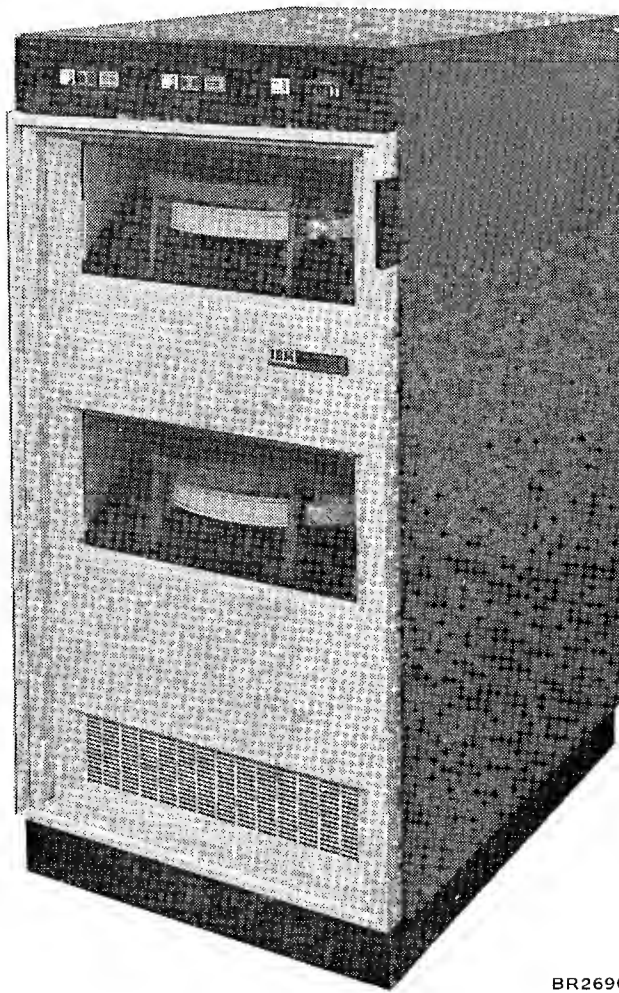
*Powered from 2250.

**Maximum operating RH is limited to 70% because of the characteristics of the photographic medium.



Inches	=	Centimeters
2.0		5,08
3.0		7,62
3.38		8,59
4.25		10,80
12.0		30,48
22.0		55,88
26.0		66,04
30.0		76,20

IBM 2310 DISK STORAGE MODELS B1 AND B2



BR2690

Dimensions

Width	22 in. (56 cm)
Depth	30 in. (76 cm)
Height	44 in. (112 cm)

Service Clearances

Front	30 in. (76 cm)
Rear	30 in. (76 cm)
Left*	24 in. (61 cm)
Right*	24 in. (61 cm)

Maximum Weight 365 lb (165 kg)

Heat Output/Hour 1800 BTU (454 kcal)

Air Flow 75 cfm (2 m³/min) maximum

Electrical Requirements**

kVA	0.7
Phase	3

Operating Environment

Temperature	60° to 90° F (15.6° to 32.2° C)
Relative humidity	10% to 80%
Maximum wet bulb	78° F (25.6° C)

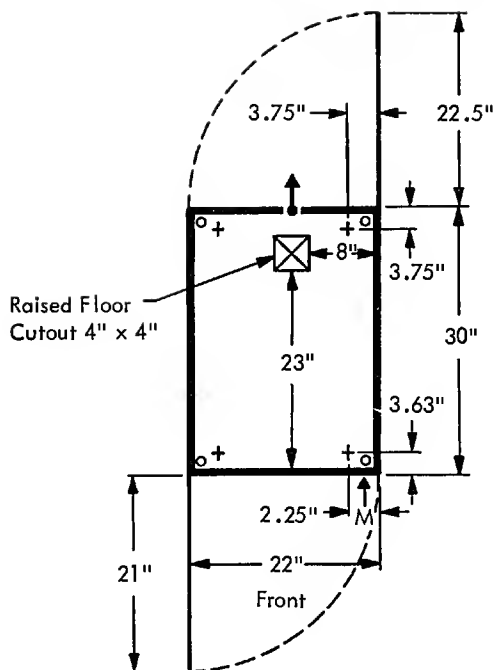
Nonoperating Environment

Temperature	50° to 110° F (10° to 43° C)
Relative humidity	8% to 80%
Maximum wet bulb	85° F (29.4° C)

Notes.

*Side clearance not required when abutted to units of like construction.

**Power is supplied by the 1133.



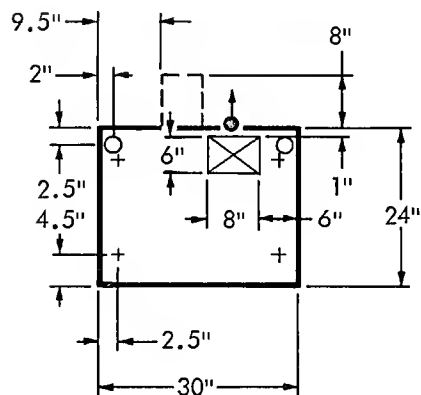
Inches = Centimeters

2.25	5,72
3.63	9,23
3.75	9,53
4.0	10,16
8.0	20,32
21.0	53,34
22.0	55,88
22.5	57,15
23.0	58,42
30.0	76,20

IBM 2311 DISK STORAGE DRIVE **MODELS 11 AND 12**



BR2679



Front

Inches = Centimeters

1.0	2,54
2.0	5,08
2.5	6,35
4.5	11,43
6.0	15,24
8.0	20,32
9.5	24,13
24.0	60,96
30.0	76,20

Dimensions

Width	30 in. (76,2 cm)
Depth	24 in. (61,0 cm)
Height	38 in. (96,5 cm)

Service Clearances

Front	36 in. (91,4 cm)
Rear	36 in. (91,4 cm)
Right*	30 in. (76,2 cm)
Left*	30 in. (76,2 cm)

Maximum Weight 390 lb (177 kg)

Heat Output/Hour 2,000 BTU (504 kcal)

Air Flow 100 cfm (3 m³/min) maximum

Electrical Requirements**

kVA	0.75
Phase	3

Operating Environment

Temperature	60° to 90° F (16° to 32° C)
Relative humidity	8% to 80%

Nonoperating Environment

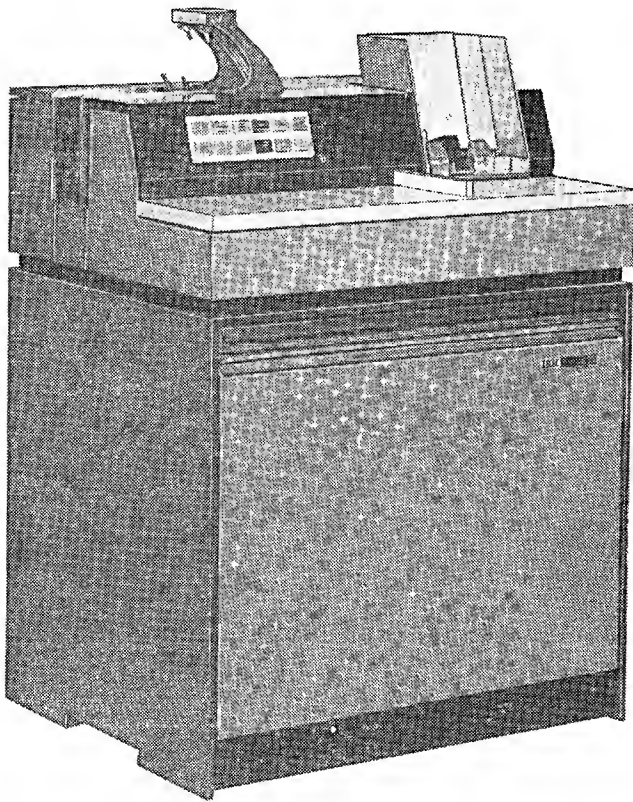
Temperature	50° to 110° F (10° to 43° C)
Relative humidity	0% to 80%

Notes.

*Clearances as shown except when not abutted to units of like construction.

**Power is supplied by the 1133.

IBM 2501 CARD READER MODELS A1 AND A2



BR2685

Dimensions

Width	30 in. (76 cm)
Depth	24 in. (61 cm)
Height	45 in. (114 cm)

Service Clearances

Front	36 in. (91 cm)
Rear	36 in. (91 cm)
Left	6 in. (15 cm)
Right	24 in. (61 cm)

Maximum Weight	340 lb (154 kg)
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Heat Output/Hour	700 BTU (176 kcal)
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Air Flow	0 cfm (0 m ³ /min) maximum
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Electrical Requirements*

kVA	0.3
Phase	1

Operating Environment

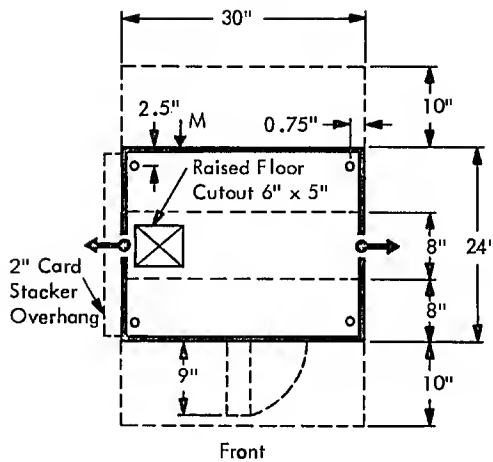
Temperature	50° to 90° F (10° to 32.2° C)
Relative humidity	20% to 80%
Maximum wet bulb	78° F (25.6° C)

Nonoperating Environment

Temperature	50° to 110° F (10° to 43° C)
Relative humidity	8% to 80%
Maximum wet bulb	80° F (26.7° C)

Note.

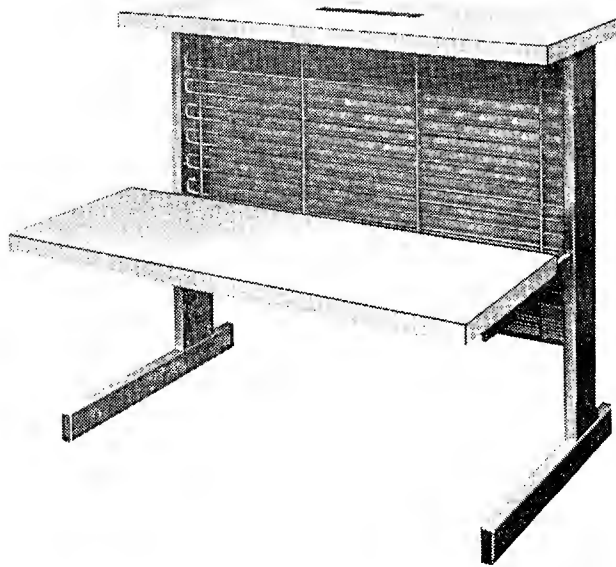
*Power is supplied by the 1131 and must be 208/230V.



Inches = Centimeters

0.75	1,91
2.0	5,08
2.5	6,35
5.0	12,70
6.0	15,24
8.0	20,32
9.0	22,86
10.0	25,40
24.0	60,96
30.0	76,20

AUXILIARY TABLE



BR2698

Dimensions

Width	32 in. (81 cm)
Depth*	23 in. (58 cm)
Height	27 in. (69 cm)

Service Clearances

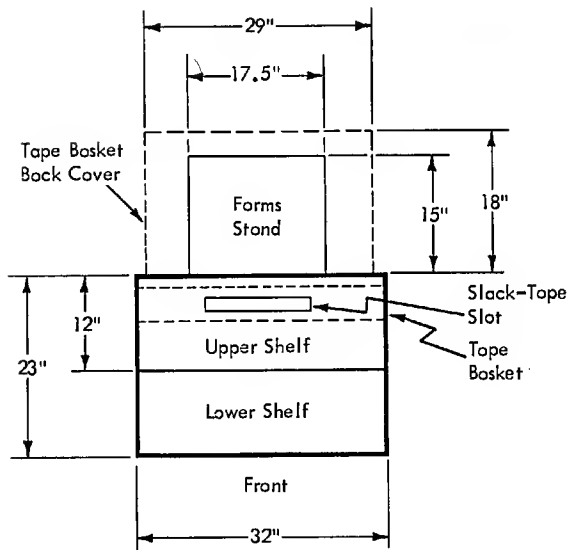
Front	12 in. (30 cm)
Rear	12 in. (30 cm)
Left	12 in. (30 cm)
Right	12 in. (30 cm)

Maximum Weight	30 lb (13.6 kg)
----------------	-----------------

The auxiliary table is available from IBM, but is not standard with the IBM 1130 system. It is for use with the 1134, 1055, and 1627 Model 1 units.

Note.

*This dimension is decreased 3" (7,6 cm) when the lower shelf is repositioned to the rear.



Inches = Centimeters

12.0	30,48
15.0	38,10
17.5	44,45
18.0	45,72
23.0	58,42
29.0	73,66
32.0	81,28

Appendix A. Summary of Specifications (U.S. Units)

Unit Specifications

Type	Model	Name	Electrical		Environmental		Weight (lbs.)	Dimensions (inches)			Service clearances (inches)				Notes
			kVA	Conn Type	BTU/hr	cfm		Width	Depth	Height	F	R	L	Rt	
1131	1A, 1B, 2A, 2B, 4A, 4B	Central Processing Unit	1.1	A, D or E	3100	720	760	58,25	29	45,5	42	36	—	30	1, 2, 5, 6
1131	1C, 1D, 2C, 2D, 3B, 3C, 3D, 5B, 5C, 5D	Central Processing Unit	1.5	A	4200	1000	1050	88,25	29	45,5	42	36	30	30	1, 2, 5
1055	—	Paper Tape Punch	0.06	—	150	—	26	15,375	17,125	8,25	12	12	12	12	3
1132	1, 2	Printer	0.5	—	1300	80	700	47	29,50	42	36	30	30	30	3
1133	—	Multiplex Control Enclosure	1.1	C	3400	500	1100	32	45,50	60	30	30	42	30	
1134	1, 2	Paper Tape Reader	0.06	—	150	—	15	19	8,75	8,75	30	12	6	6	3
1231	1	Optical Mark Page Reader	1.2	A	3700	300	620	43,50	24	44,75	42	42	36	30	2
1403	6, 7	Printer	1.0	—	2500	310	750	47,75	28,50	53,25	36	36	30	30	4
1442	5	Card Punch	0.7	—	1800	50	525	43	24	49	36	30	18	6	3
1442	6, 7	Card Read Punch	0.7	—	1800	50	525	43	24	49	36	30	18	6	3
1627	1	Plotter	0.1	—	250	—	33	18	15	10	12	12	12	12	3
1627	2	Plotter	0.1	—	250	—	55	40	15	10	12	12	12	12	3
2310	B1, B2	Disk Storage	0.7	—	1800	75	365	22	30	44	30	30	24	24	4
2311	11, 12	Disk Storage Drive	0.75	—	2000	100	390	30	24	38	36	36	30	30	4
2501	A1, A2	Card Reader	0.3	—	700	—	340	30	24	45	36	36	6	24	3
2250	4	Display Unit	1.0	A	3000	420	600	58,5	64,5	50	30	10	40	30	
2285	—	Display Copier	1.5	—	750	75	350	22	30	40	30	30	30	26	7

Notes.

1. The base of the processor is 31,50 inches high; the console adds another 14,0 inches for a total height of 45,5 inches.
2. This unit is equipped with radio interference control circuitry and requires a good wired earth or building ground. Total resistance of the ground conductor, measured between the receptacle and the building grounding point, must not exceed 3 ohms. For proper operation, all components of the system or systems to which this unit is attached must have the same ground reference. Conduit is not a satisfactory means of grounding.
3. Powered from 1131.
4. Powered from 1133.
5. Power is supplied by 1133 if installed.
6. If a 1231, 1442-5 or a 2501 is installed, the 1131 must be 208/230V ac.
7. Powered from 2250.

Connector Types

Type	Plug	Connector	Receptacle	Branch Circuit	Voltage
A	Russell & Stoll, FS3720	FS3913	FS3743	20 amp, 1 phase, 3-wire	208/230
C	Russell & Stoll, FS3760	FS3934	FS3754	30 amp, 3 phase, 4-wire	208/230
D*	Hubbell 9338		9344	30 amp, 1 phase, 3-wire	115**
E*	Arrow Hart 5717		5716	30 amp, 1 phase, 3-wire	115**

*All 115-volt machines shipped after January 1, 1968, are equipped with Arrow Hart (5717) plugs. Machines shipped prior to that date use Hubbell (9338) plugs.

**Measure voltage at receptacle before connecting power cord to be sure correct voltage exists.

Appendix B. Summary of Specifications (Metric)

Unit Specifications

Type	Model	Name	Electrical		Environmental		Weight (kg)	Dimensions (centimeters)			Service clearances (centimeters)				Notes
			kVA	Power cord style	kcal	m ³ /min		Width	Depth	Height	F	R	L	Rt	
1131	1A, 1B 2A, 2B	Central Processing Unit	1.1	A or D	781	20,7	345,7	148	74	115,6	107	91	—	76	1,2, 5,6
1131	1C, 1D 2C, 2D 3B, 3C 3D, 5B 5C, 5D	Central Processing Unit	1.5	A or D	1058	28,3	477	224	74	115,6	107	91	76	76	1,2,5
1055	—	Paper Tape Punch	0,06	—	37,8	—	16,3	40	44	21	30	30	30	30	3
1132	—	Printer	0,5	—	328	2,26	317,5	119	75	107	91	76	76	76	3
1133	—	Multiplex Control Enclosure	1.1	C	857	14,2	499	81	116	152	76	76	107	76	
1134	1, 2	Paper Tape Reader	0,06	—	37,8	—	6,8	48	22	22	76	30	15	15	3
1231	1	Optical Mark Page Reader	1,2	A	932	8,49	281	110	61	114	107	107	91	76	2
1403	6, 7	Printer	1.0	—	630	8,77	340	121	72	135	91	91	76	76	4
1442	5	Card Punch	0,7	—	454	1,42	238	109	61	124	91	76	46	15	3
1442	6, 7	Card Read Punch	0,7	—	454	1,42	238	109	61	124	91	76	46	15	3
1627	1	Plotter	0,1	—	63	—	15	46	38	2,5	30	30	30	30	3
1627	2	Plotter	0,1	—	63	—	24,9	102	38	2,5	30	30	30	30	3
2310	B1, B2	Disk Storage	0,7	—	454	2,12	165	56	76	112	76	76	61	61	4
2311	11, 12	Disk Storage Drive	0,75	—	504	3	177	76	61	96,5	91	91	76	76	4
2501	A1, A2	Card Reader	0,3	—	17,6	—	154	76	61	114	91	91	15	61	3
2250	4	Display Unit	1.0	E or F	756	11,9	272	149	164	127	76	25	102	76	
2285	—	Display Copier	1.5	—	187	2,12	159	56	76	102	76	76	76	66	8

Notes.

1. The base of the processor is 80 centimeters high; the console adds another 35,6 centimeters for a total height of 115,6 centimeters.
2. This unit is equipped with radio interference control circuitry and requires a good wired earth or building ground. Total resistance of the ground conductor, measured between the receptacle and the building grounding point, must not exceed 3 ohms. For proper operation, all components of the system or systems to which this unit is attached must have the same ground reference. Conduit is not a satisfactory means of grounding.
3. Powered from 1131.
4. Powered from 1133.
5. Power is supplied by the 1133 if installed.
6. If a 1231, 1442-5 or a 2501 is installed, the 1131 must be 195, 220 or 235V ac.
7. All 115-volt machines shipped after January 1, 1968, are equipped with Arrow Hart (5717) plugs. Machines shipped prior to that date use Hubbell (9338) plugs.
8. Powered from 2250.

Power Cord Styles

Power cord style	Cable			Conductors				Insulation					Branch circuit
	Nominal O.D.		Body color	Qty	AWG	Shield	Material	Nominal O.D.		Material	Body color	Voltage rating	
	Inch	cm						Inch	cm				
A. 50 Hz	0,405	1,0	Grey	3	12	None	Stranded tinned copper	0,03	0,076	PVC	Note 1	Note 2	15 amp, 1 phase, 3-wire
C. 50 Hz*	0,750	1,9	Grey	5	10	Yes	Stranded tinned copper	0,094	0,24	PVC	Note 3	600	30 amp, 3 phase, 3-wire
D. 50 Hz**	0,405	1,0	Grey	3	12	None	Stranded tinned copper	0,03	0,076	PVC	Note 4	Note 2	15 amp, 1 phase, 3-wire
E. 50 Hz Note 5	0,58	1,47	Grey	3	12	Yes	Stranded tinned copper	0,094	0,24	PVC	Note 1	600	20 amp, 1 phase, 3-wire
F. 50 Hz** Note 5	0,5B	1,47	Grey	3	12	Yes	Stranded tinned copper	0,094	0,24	PVC	Note 4	600	20 amp, 1 phase, 3-wire

*For countries using 50 hertz power.

**United Kingdom.

Notes.

1. Green/Yellow for lead 1, Blue for lead 2, Black for lead 3.
2. Ground to any conductor, 250 volts. Between any two conductors, 500 volts.
3. Black for leads 1, 2, and 3, Blue for lead 4, Green/Yellow for lead 5.
4. Green/Yellow for lead 1, Black for lead 2, Red for lead 3.
5. An external flexible steel conduit 0.75" I.D. (1,9 cm) covers the attachment cord. This is grounded at the 2250 end and must also be grounded at the receptacle end.

Unit Phase Distribution

Unit	Phase*
1055	1 and 2
1131	1 and 2
1132	1 and 2
1133	1, 2, and 3
1134	1 and 2
1231	**
1403	1, 2, and 3
1442	1 and 2
1627	1 and 2
2250	**
2285	***
2310B	1, 2, and 3
2311	1, 2, and 3
2501	1 and 2

Notes.

*Single-phase loads are connected.

**Receptacle is customer assignable.

***Same as 2250.

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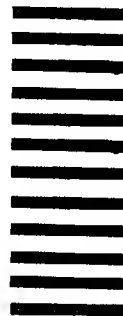
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